REMARKS

Applicants appreciate the thorough examination of the present application as reflected in the Final Official Action mailed March 12, 2004. Applicants also appreciate the indication of allowance of Claims 15, 21, 22, 26, 32, 38 and 39. Applicants have cancelled Claims 7 and 86. Applicants have amended Claim 4 to write Claim 4 in independent form and have re-written the description of the shorting channels to recite that they extend to but not beyond the periphery of the p-type regions. Applicants submit that such a change in the description of the shorting channels does raise new issues as a similar description is found in Claim 12 in that Claim 12 recites that the second n-type regions do not extend substantially past the periphery of the p-type regions. Accordingly, Applicants request entry of the present Amendment as it does not raise new issues and, Applicants submit, places the application in condition for allowance.

The IDS

Applicants wish to bring to the Examiner's attention an IDS of materials that was submitted February 4, 2004 and included two references. The PAIR system indicates that the IDS has an entry date of February 6, 2004. Applicants request that the materials be considered by the Examiner and that an initialed copy of the PTO-1449 form be returned with any subsequent action.

The Section 112 Rejections

Claims 4, 7, 25, 27-31, 33-37 and 86 stand rejected under 35 U.S.C. § 112 first and second paragraphs are directed to the embodiment of Figure 6 and are inconsistent with independent Claims 1, 12 and 83 which do not appear to read on Figure 6. Official Action, p. 2. Applicants submit that Claims 4, 7, 25, 27-31, 33-37 and 86 were directed to embodiments of Figure 7, as the epitaxial layer of these claims is layer 27 of Figure 7. Furthermore, Figure 7 is described with reference to at least two different embodiments of the present invention with respect to the epitaxial layer 27. In one of these embodiments, the shorting channels are provided by an undifferentiated epitaxial layer and in the other embodiments, the shorting channels

are provided by implanting in and/or through the epitaxial layer. See Specification, p. 16. In contrast to the claims that were written in independent form, Applicants amended Claims 1, 12 and 83 to expressly exclude the undifferentiated epitaxial layer embodiments of the present invention. As such, Applicants submit that Claims 1, 12, and 83 as amended do not read on the use of an undifferentiated epitaxial layer as providing the shorting channels.[1]

Applicants have cancelled Claims 7 and 86. Applicants have amended Claim 4 to write Claim 4 in independent form and have revised the recitation of the shorting channels to recite that they do not extend past the periphery of the p-type regions.

Embodiments of the present invention as recited in Claim 1 include devices as illustrated in Figure 6. In particular, the shorting channels of Claim 1 correspond to the regions 26 and the drift layer corresponds to the layer 12. Thus, as seen in Figure 6, the shorting channels extend to but not into the drift layer 12. Applicants have amended or cancelled all claims depending from Claim 1 that recite an epitaxial layer that extends into the drift layer. Thus, Claim 4 has been amended as described above and Claim 7 has been cancelled. Accordingly, Applicants submit that there is no inconsistency between Claim 1 and the claims that depend from Claim 1.

Claim 12 includes embodiments of the present invention as illustrated in Figures 6 or 7. In particular Claim 12 recites that the second regions of n-type silicon carbide (26 or 26') have a carrier concentration less than the carrier concentration of the first regions of n-type silicon carbide (24) and extend from the first regions of n-type silicon carbide (24) to, but not substantially beyond, the peripheral edges of the first regions of p-type silicon carbide (20). In Figure 6, the second regions of n-type silicon carbide 26 do not extend substantially beyond the peripheral edges of the first regions of p-type silicon carbide 20. In Figure 7, the second regions of n-type silicon carbide 26' do not extend substantially beyond the peripheral edges of the first regions of p-type silicon carbide 20. Thus, Claim 12 includes the embodiments of Figure 6 as well as the embodiments of Figure 7 where the regions 26' are distinct from the epitaxial layer 27 of Figure 7. Thus, the specification at page 16, lines 28 and 29

[1] Applicants submit that the allowable dependent claims written in independent form are not so limited.

states that the shorting channels 26' "preferably, may be formed by implantation in and/or through the regrown silicon carbide layer 27." Accordingly, Applicants submit that, as recited in Claim 12, the second regions of n-type silicon carbide are distinct regions of n-type silicon carbide that do not extend substantially beyond the periphery of the p-type silicon carbide region. Such a description is illustrated by the regions 26 in Figure 6 and the regions 26' in Figure 7. Thus, Applicants submit that there is no inconsistency between Claim 12 and the dependent claims that recite an epitaxial layer as the epitaxial layer is illustrated as the region 27 of Figure 7.

Claim 83 has language similar to that in Claim 1 and Claim 86 has been cancelled. Accordingly, Applicants submit that there is no inconsistency between the language of Claim 83 and any of its pending dependent claims.

The Obviousness Rejections

Claims 1, 2, 4, 6, 7, 10-12, 17-19, 23-25, 33-36, 40, 41, 83, 84, 86 and 89 stand rejected under 35 U.S.C. § 103 as obvious in light of United States Patent No. 6,165,822 to Okuno et al. (hereinafter "the '822 patent") and Chung et al. "Improved Inversion Channel Mobility for 4H-SiC MOSFETs Following High Temperature Anneals in Nitric Oxide" (hereinafter "Chung"). Claims 8, 9, 13, 14, 16, 27-31 and 87 stand rejected under 35 U.S.C. § 103 as obvious in light of the '822 patent, Chung and further in view of United States Patent No. 6,221,700 to Okuno et al. (hereinafter "the '700 patent"). Finally, Claims 5, 20, 37 and 88 stand rejected under 35 U.S.C. § 103 as obvious in light of the '822 patent, Chung and United States Patent No. 5,170,231 to Fuji et al. (hereinafter "the '321 patent").

Claims 1, 12 and 83 are independent claims. In the interest of brevity, Applicants will not repeat the arguments presented in Applicants' previous Amendment but incorporate those arguments as if set forth fully herein. Applicants will discuss the rejections with reference to the response to Applicants' previous arguments. In particular, the Official Action asserts that the '822 patent discloses the recitations of the claims because the "'n-type shorting channels' read on inherent subportions of layer 5 in regions 3a, 3b, and the 'drift layer' reads on layer 2 plus the inherent subportion of layer 5 on layer 2." Official Action, p. 3.

Applicants respectfully submit that inherency is not a concept that is appropriate in an obviousness rejection. Moreover, the Official Action arbitrarily defines regions of the structure of the '822 patent to correspond to the recitations of the claims using the present specification as a road map. The '822 patent does not describe the layer 5 as a divided layer and mentions no "subportions." To somehow divide an undivided layer into subportions and then assert that those subportions disclose any of the recitations of the claims is improper.

For example, Claim 1 recites that the "n-type shorting channels" extend "from respective ones of the n-type silicon carbide regions through the p-type silicon carbide regions and to the n-type silicon carbide drift layer" and that they **"extend to but not into the n-type silicon carbide drift layer**." In contrast, the '822 patent describes an n-type layer that extends completely between the n+ regions 4a and 4b. To somehow arbitrarily divide this layer to read on the shorting channels that do not extend into the drift layer is to use hindsight and establish a distinction in the layer of the '822 patent that is not described in the '822 patent. This is clearly the use of hindsight. It is clear that the '822 patent did not appreciate any distinction between any portion of the layer 5.

Likewise, Claim 12 recites "second regions of n-type silicon carbide having a carrier concentration less than the carrier concentration of the first regions of n-type silicon carbide and which **extend from the first regions of n-type silicon carbide to, but not substantially beyond, the peripheral edges of the first regions of p-type silicon carbide**." As discussed above, the '822 patent describes a layer 5 that extends completely between the n+ regions 4a and 4b and extends completely across the drift layer 2. There is no discussion in the '822 patent of a region that stops at the periphery of the p-type regions 3a and 3b. To arbitrarily assert that such a region is "inherent" in the layer 5 of the '822 patent is to ignore the teachings of the '822 patent and use the present specification as a roadmap in defining regions in the structure of the '822 patent that are not described or suggested by the '822 patent itself. Accordingly, Applicants submit that Claim 12 and the claims that depend from Claim 12 are neither disclosed nor suggested by the cited references.

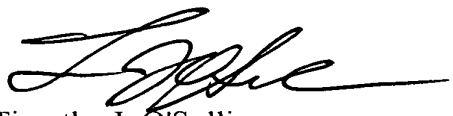
Finally, Claim 83 recites that "**the region that is configured to self-deplete extends to but not into the n-type silicon carbide drift layer**." As discussed above, layer 5 of the '822 patent does not disclose a region that stops at the drift layer but describes a region that extends past the drift layer. Accordingly, Applicants submit that Claim 83 and the claims that depend from Claim 83 are neither disclosed nor suggested by the cited references.

Conclusion

Having addressed each of the issues raised in the Official Action, Applicants submit that the present application is in condition for allowance, which action is respectfully requested.

It is not believed that an extension of time and/or additional fee(s), including fees for net addition of claims, are required, beyond those that may otherwise be provided for in documents accompanying this paper. In the event, however, that an extension of time is necessary to allow consideration of this paper, such an extension is hereby petitioned under 37 C.F.R. §1.136(a). Any additional fees believed to be due in connection with this paper may be charged to Deposit Account No. 50-0220.

Respectfully submitted,



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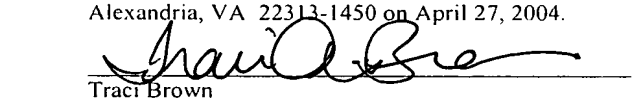

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